

# JAPAN

## EDICT OF GOVERNMENT

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JIS Z 4810 (2005) (English): Protective rubber gloves for radioactive contamination

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*The citizens of a nation must  
honor the laws of the land.*

Fukuzawa Yukichi

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JAPANESE  
INDUSTRIAL  
STANDARD

Translated and Published by  
Japanese Standards Association

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JIS Z 4810 : 2005

(JSAA/JSA)

**Protective rubber gloves for radio-  
active contamination**

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## Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Safety Appliances Association (JSAA)/ Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS Z 4810 : 1995** is replaced with this Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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In the event of any doubts arising as to the contents,  
the original JIS is to be the final authority.

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## Protective rubber gloves for radioactive contamination

**1 Scope** This Japanese Industrial Standard specifies the protective rubber gloves for radioactive contamination (hereinafter referred to as "gloves") used in the establishments related to nuclear energy.

**2 Normative references** The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS K 6250 *Rubber—General rules of physical testing methods*

JIS K 6251 *Rubber, vulcanized or thermoplastic—Determination of tensile stress-strain properties*

JIS K 6252 *Rubber, vulcanized or thermoplastics—Determination of tear strength*

JIS K 6257 *Rubber, vulcanized or thermoplastic—Determination of heat ageing properties*

JIS K 6258 *Rubber, vulcanized or thermoplastic—Determination of the effect of liquids*

JIS Z 9015-1 *Sampling procedures for inspection by attributes—Part 1 : Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection*

### 3 Type and dimension

**3.1 Type** The gloves are classified according to the material and shape to use as follows.

#### 3.1.1 Material

- a) **Class 1** Gloves which use natural rubber latex as the main material
- b) **Class 2** Gloves which use synthetic rubber latex, natural rubber solutions or synthetic rubber solutions as the main material

#### 3.1.2 Shape

- a) **Shape S** Straight finger type gloves
- b) **Shape C** Bent finger type gloves

**3.2 Main material** The material of gloves shall be natural rubber latex, synthetic rubber latex, natural rubber solutions or synthetic rubber solutions.

Information : Since some people are sensitive to the water-soluble protein of natural rubber origin (immediate type I allergy), the gloves made of other rubber compounding may be required.

### 3.3 Subsidiary material

- a) In order to make it easy to wear and remove gloves, finishing agents, lubricants or dusting powders can be used.
- b) Colouring agents to use shall be safe.
- c) The material to be used as finishing agents shall not be hazardous to a living body, and the name of the material shall be indicated as necessary.

Information : Since some people are sensitive to the specific rubber compounding ingredients (delayed type IV allergy), the gloves made of other rubber compounding may be required.

**3.4 Nominal number and dimension** The nominal number and dimension of gloves shall be as specified in table 1.

**Table 1 Nominal number and dimension**

Unit: mm

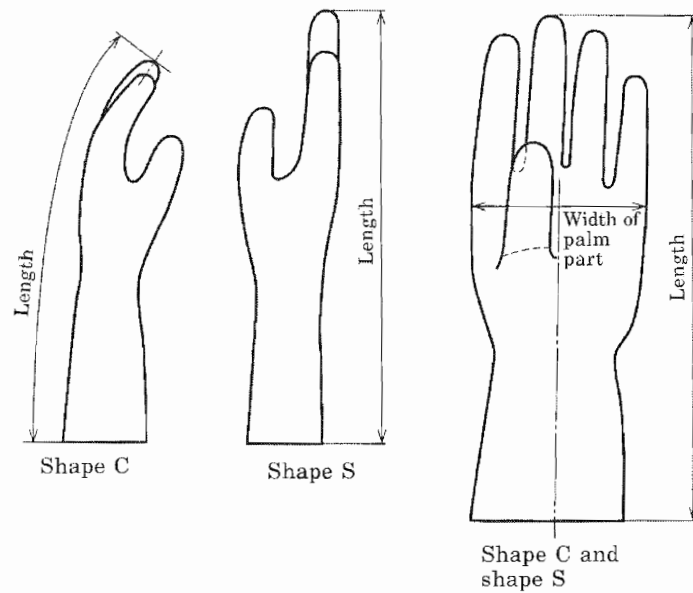
Nominal number	Width of palm part <sup>(1)</sup>	Length <sup>(2)</sup>	Thickness <sup>(3)</sup>
6.5	83 ± 5	270 min.	0.20 to 0.35
7	89 ± 5		
7.5	95 ± 5		
8	102 ± 6		
8.5	108 ± 6	280 min.	
9	114 ± 6		

Notes <sup>(1)</sup> The width of palm part refers to the dimension of the palm part in a direction at right angles to the finger direction, measured with a glove placed on a flat surface so as to be pressed down as shown in figure 1.

<sup>(2)</sup> The length refers to the distance between the head of the middle finger and the lower end of the glove as shown in figure 1.

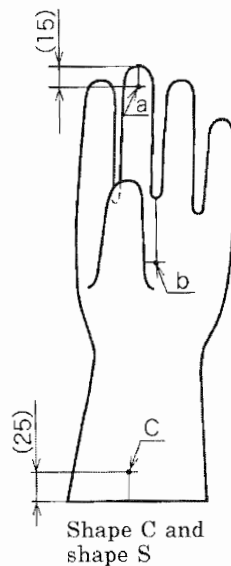
<sup>(3)</sup> The thickness refers to the rubber thickness of the fingertip, the palm part and the terminal part of the wrist as shown in figure 2, and is measured using the thickness gage specified in **JIS K 6250**.





**Figure 1 Measurement of length and width of gloves**

Unit : mm



- a : 15 mm from the middle finger head
- b : Almost central part of the palm part
- c : 25 mm from the terminal part of the wrist

**Figure 2 Measurement of thickness of gloves**

**4 Structure and appearance** The structure and appearance, when the test is performed in accordance with 6.2, shall conform to each item below.

- a) The gloves shall use the five finger type, be uniform in wall thickness, and be free from defects detrimental to use such as flaws, holes, blowholes, spots, soil, a mixture of foreign substances.
- b) The terminal part of the wrist of gloves shall be reinforced with a rolled form, or with the reinforcement means equivalent to this.

- c) The part or whole surface of gloves shall be roughened by finishing.

## 5 Performance

**5.1 Tensile strength and extension elongation at break** The tensile strength and extension elongation at break of gloves, when the test is performed in accordance with the method in 6.4.3, shall conform to the value given in table 2.

**Table 2 Tensile strength and extension elongation at break**

	Tensile strength MPa	Extension elongation at break %
Class 1	23 min.	700 min.
Class 2	17 min.	550 min.

**5.2 Tensile strength and extension elongation at break after aging** The tensile strength and extension elongation at break after aging, when the test is performed in accordance with the method in 6.4.4, shall conform to the value given in table 3.

**Table 3 Tensile strength and extension elongation at break after aging**

	Tensile strength after aging MPa	Extension elongation at break after aging %
Class 1	17 min.	560 min.
Class 2	12 min.	490 min.

**5.3 Tensile strength and extension elongation at break after immersion in chemicals** The tensile strength and extension elongation at break after immersion in chemicals, for Class 1, when the test is performed in accordance with the method in 6.4.5, shall conform to the value given in table 4.

**Table 4 Tensile strength and extension elongation at break after immersion in chemicals**

Name of chemicals	Tensile strength MPa	Extension elongation at break %
10 % hydrochloric acid	19.6 min.	600 min.
10 % sodium hydroxide solution		

**5.4 Tearing strength** The tearing strength of a glove, for Class 1, when the test is performed in accordance with the method in **6.5**, shall be 590 N/cm or more.

**5.5 Pinhole** The gloves, when the test is performed in accordance with the method in **6.6**, shall conform to the specification given in table 6.

## **6 Test method**

**6.1 Test items** The test items of gloves shall be as follows :

- a) Structure and appearance test
- b) Dimension test
- c) Tension test
- d) Tear test
- e) Pinhole test (water tightness test)

**6.2 Structure and appearance test** For the structure and appearance, all gloves shall be examined by visual observation.

**6.3 Dimension test** The dimension test of the locations shown in figure 1 and figure 2 shall be performed with regard to the following items.

- a) **Width of palm part** For the width of palm part, the dimension of the palm part in a direction at right angles to the finger direction with gloves placed on a flat surface so as to be pressed down as shown in figure 1 shall be measured.
- b) **Length** For the length of gloves, the length shown in the Note (2) of table 1 shall be measured from the head of the middle finger as shown in figure 1.
- c) **Thickness** For the thickness of gloves, the following location shown in figure 2 shall be measured using the thickness gage specified in **JIS K 6250**.
  - 1) Point a : Location at a distance of 15mm from the head of the middle finger
  - 2) Point b : Almost central location of the palm part
  - 3) Point c : Location at a distance of 25 mm from the lower end

In addition, the measurement of the thickness shall be performed with the rubber coating of two layers closely contacted, and 1/2 of the measured value shall be taken as the thickness. However, when the thin part of a glove is visually detected, the thickness of single layer of the location shall be measured.

## **6.4 Tensile test**

**6.4.1 Specimen** The specimens to be used in **6.4.3**, **6.4.4** and **6.4.5** shall be sampled from the head of the middle finger, the palm part or the wrist part shown in figure 2 of unused gloves, and they shall be the No. 3 type dumbbell specimen or the No. 6 type specimen specified in **JIS K 6251**.

**6.4.2 General test conditions** The general test conditions shall be in accordance with **JIS K 6250**.

**6.4.3 Tensile strength and extension elongation at break** The tensile strength and extension elongation at break shall be measured as specified in **JIS K 6251**.

**6.4.4 Tensile strength and extension elongation at break after aging** The tensile strength and the extension elongation at break shall be measured in accordance with the same method as that specified in **6.3.2** after performing the aging treatment at  $70^{\circ}\text{C} \pm 1^{\circ}\text{C}$  of test temperature, for  $168 \text{ h} \pm 2 \text{ h}$  of test time with the "forced-circulation type air-oven-aging-test machine (crosswind type)" specified in clause **7** of **JIS K 6257**. In this case, the aging treatment shall be performed on the whole glove, and the specimen shall be taken after aging treatment.

**6.4.5 Test of immersion in chemicals** In accordance with the method specified in **JIS K 6258**, after the specimen is immersed under the test condition for each chemical given in table 5, this specimen shall be taken, washed with water, lightly wiped off, and promptly the tensile strength and the extension elongation at break shall be measured in accordance with the same method as that specified in **6.4.3**.

**Table 5 Test of immersion in chemicals**

Name of chemicals	Temperature $^{\circ}\text{C}$	Immersion time h
10 % hydrochloric acid	$23 \pm 2$	48
10 % sodium hydroxide solution		

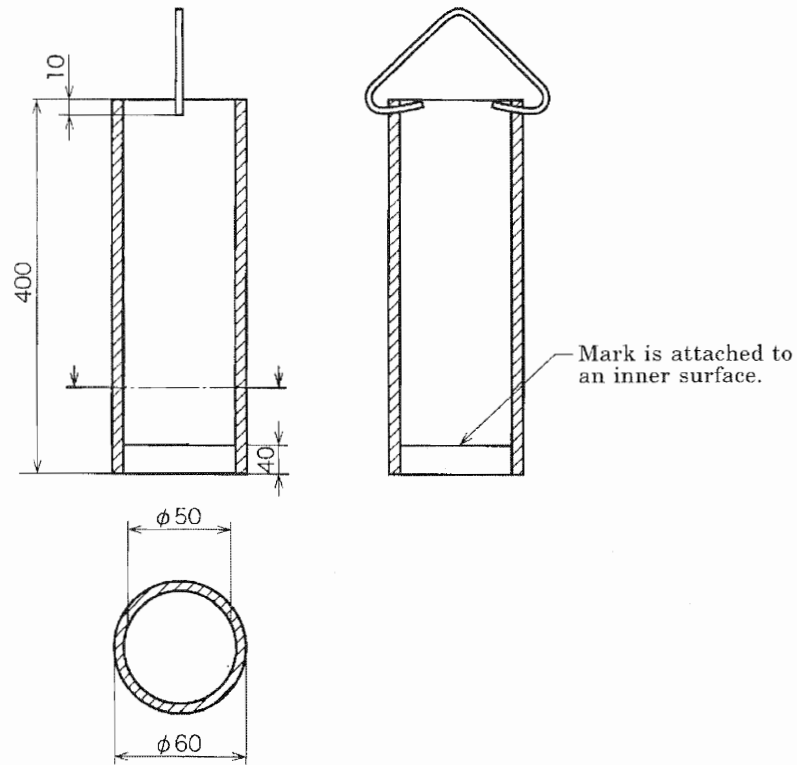
**6.5 Tear test** The tearing strength shall be measured using the crescent-shaped specimen in accordance with the method specified in **JIS K 6252**.

**6.6 Pinhole test (water tightness test)**

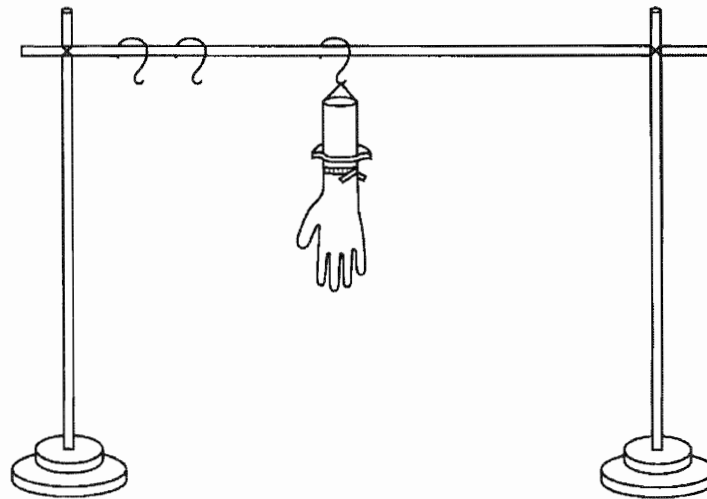
**6.6.1 Apparatus and instrument** The apparatus and instrument shall be as follows.

- The cylinder about 50 mm in inside diameter, about 60 mm in outside diameter, about 400 mm in length as shown in figure 3.
- The fastener for fixing the glove and cylinder
- When water is filled inside the glove shown in figure 4, the hanging tool for holding it vertically.
- Measuring cylinder of  $1\,000 \text{ cm}^3$

Unit: mm



**Figure 3 Cylinder**



**Figure 4 Hanging tool**

**6.6.2 Test method** The test method shall be as follows.

- a) Keep the opening part of the cuff of the glove upward, and fix a cylinder to the opening with the O-ring shaped fastener firmly. Attach the cylinder to the location at a distance of 40 mm from the cuff of the glove.
- b) Attach to the hanging tool so that the condition in **a)** can be held.
- c) Fill the glove with  $1\,000\text{ cm}^3 \pm 50\text{ cm}^3$  of water of  $36^\circ\text{C}$  or lower measured by the measuring cylinder in the glove.
- d) When 2 min passes as it is, check the water leakage from the glove by visual observation at room temperature.

Remarks 1 In order to make visual detection of a pinhole easy, a dye which does not degrade the material of gloves may be used.

2 When a small size glove is tested, water may remain in the cylinder under the condition that water is filled inside the glove.

**7 Inspection** The inspection of gloves shall be a sampling inspection performed in accordance with the method specified in **JIS Z 9015-1**, and the inspection level and the acceptable quality level (hereafter referred to as "AQL") shall conform to the level given in table 6.

**Table 6 Inspection level and AQL**

Item	Inspection level	AQL
Dimension (width of palm part, length and thickness)	S-2	4.0
Tensile strength and extension elongation at break (including after aging and after immersion in chemicals)	S-2	4.0
Tearing strength	S-2	4.0
Pinhole (water tightness)	I	1.5

**8 Designation of product** The product shall be designated by the type, designation and nominal number based on material.

Example 1 Class 1 protective rubber gloves for radioactive contamination 8.5

Example 2 Class 2 protective rubber gloves for radioactive contamination 8.5

## 9 Marking

**9.1 Marking of product** The following matter shall be marked on the product body.

- a) Nominal number

**9.2 Marking of package** The following matters shall be marked on the package.

- a) Designation



- b) Nominal number
- c) Manufacturer's name or importer's names, or their abbreviation
- d) Manufacture year and month or its abbreviation, or lot number

**10 Instruction manual** The instruction manual which describes the precautions for handling shall be attached to the packaging container.

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Related standards :

JIS T 9107 *Single-use sterile surgical rubber gloves—Specification*

ISO 37 : 1994 *Rubber, vulcanized or thermoplastic—Determination of tensile stress-strain properties*

ISO 10282 : 2002 *Single-use sterile rubber surgical gloves—Specification*



Errata for JIS (English edition) are printed in *Standardization Journal*, published monthly by the Japanese Standards Association, and also provided to subscribers of JIS (English edition) in *Monthly Information*.

Errata will be provided upon request, please contact:

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